



Air Quality Data Assimilation Session Report

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Participants:

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Topics Covered

- Seven presentations
 - Aerosol assimilation
 - GFS-GOCART coupling completed
 - Demonstrated the impact of biomass burning emissions on CMAQ PM2.5 predictions
 - Ozone assimilation
 - Demonstrated ozone forecast improvements by using additional advanced satellite data compared to traditional SBUV/2 data assimilation
 - Trace gas product development from GOME-2
 - Algorithm development work underway. Preliminary NO2 trace gas retrievals developed. Operational implementation in 2008
 - Photochemical parameterization of ozone and water vapor for NWP models
 - The new scheme reduced ozone forecast errors



Atmospheric Chemistry/Aerosols/Air Quality

- Long Term Vision:
 - Provide a 4-D analysis for air quality prediction while improving the weather analysis & forecasts via radiative feedback
 - Exploit GSI and ESMF framework
 - Species to be assimilated/predicted:
 - Trace gases: CO, CH₄, O₃, NO₂
 - Aerosols: AOD, PM_{2.5}, PM-Coarse
 - Why:
 - Provide improved air and sea surface temperature analysis
 - Provide initial/boundary for Air Quality Forecast Capability
 - Current and Future Satellites
 - Aerosols: MODIS, VIIRS, GOME-2
 - Trace Gases: OMI, GOME-2, AIRS/IASI



- Methodology:
 - Radiance Assimilation (long-term)
 - Continued CRTM development
 - Polarization in the UV/VIS
 - Need for accurate 3-D error co-variances
 - Begin 1-D variational experiments
 - Continue forward model improvements for ozone/PM
 - Product development/assimilation (short-term):
 - Demonstrate the impact on regional/global forecasts (AOD, trace gases)
 - Aerosols: AOD, PM_{2.5}, PM-Coarse
 - Forecast verification



New Satellite Products

- Request JCSDA to continue the support of the development of trace gas and aerosol products from new satellite sensors
 - OMI total and profile ozone
 - GOME-2 total and profile ozone
 - GOME-2 aerosol products (absorbing and scattering aerosol optical depth)
 - GOME-2 NO₂, H₂CO, etc.
 - AIRS CO, CH₄, etc.
 - Similar NPP/NPOESS instruments and products in the future
 - New innovative algorithm approaches using combination of measurements in the UV and IR